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ABSTRACT

The effects of covert operant reinforcement upon remedial reading learning tasks were investigated. Forty junior high school students were taught to imagine either neutral scenes (control) or positive scenes (treatment) upon cue while reading. It was hypothesized that positive covert reinforcement would enhance performance on several measures of learning and task-related behavior. The several research hypotheses were not supported by the data, and problems of this study were discussed, as were implications for future research. (Author)

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COVERT OPERANT REINFORCEMENT OF REMEDIAL READING LEARNING TASKS

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Abstract

This study investigated the effects of covert operant reinforcement upon remedial reading learning tasks. Forty junior high school students were taught to imagine either neutral scenes (control) or positive scenes (treatment) upon cue while reading. It was hypothesized that positive covert reinforcement would enhance performance on several measures of learning and task-related behavior. The several research hypotheses were not supported by the data, and problems of this study are discussed, as are implications for future research.

COVERT OPERANT REINFORCEMENT OF REMEDIAL READING LEARNING TASKS[1]

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Objectives

This study was designed to study the effects of covert operant reinforcement (COR) upon the performance of certain remedial reading learning tasks. Junior high school students received instruction in imagining positive scenes, and then used these covert reinforcers to influence their performance in a classroom situation.

Theoretical framework

Within recent years educators and psychologists have become increasingly concerned with the relationship between the laws of learning

[1]Special thanks go to Mrs. Lynn Yates for her invaluable assistance in administering the study and in collecting the data. The expertise in statistical analysis of Ms. Constance Ripstra is likewise appreciated. Requests for reprints may be addressed to Verne G. Schmickley, Eaton County Mental Health Center, P.O. Box 39, Charlotte, Michigan 48813.

and covert (non-behavioral) events. It would seem that some of the staunchest behaviorists have come to view the person as more than just an amalgam of gross behavioral responses to external stimuli. Current concern is focused upon how and to what extent may the laws of learning be applied to covert events, i.e. cognitive and affective phenomena.

The research and clinical literature in the area is rich and rapidly expanding, and a comprehensive survey and review is beyond the scope of this paper. The interested reader is directed to excellent reviews of the literature by Skinner (1953), Bandura (1969), Cautela (1969), Kanfer and Phillips (1970), Mahoney (1970, 1972), Danaher (1972), Elson (1972), McCardell (1972), Thoreson (1972, 1973), and Johnson and Elson (1974).

The theoretical basis of the present study is an extension of previous work by Homme and by Cautela. Homme (1965) assumed that covert responses observe the same principles as do overt behaviors. Cautela (1970) further postulated that covert events have the potential to modify overt behaviors. Positive imaginal scenes have been used clinically and in the laboratory by Cautela (1970) to investigate covert operant reinforcement, but to date no studies have investigated the applicability of COR to school learning tasks (Johnson and Elson, 1973).

This study was designed to ease that dearth. It was hypothesized that covert operant reinforcement of remedial reading tasks would produce the following results: improved performance on a standardized measure of

reading speed-accuracy, vocabulary skills, and reading comprehension; increased volume of classroom reading; improved performance on daily review exercises of vocabulary and comprehension; improved attitudes toward reading and toward school in general; and a decrease in absenteeism from reading class.

Method

Subjects

Participants in this study were 40 junior high school students enrolled in a remedial reading class. The existing remedial reading program was federally funded (Title I) for students from low socio-economic backgrounds and with identified deficits in reading performance. Eight of the Ss were female, and 32 were male. Twenty-six Ss were seventh graders, 11 were eighth graders, and 3 were in the ninth grade. The age of the students ranged from 11 through 16. Within each of the four daily reading class periods Ss were randomly assigned into the two treatment conditions.

Learning tasks

As part of the existing curriculum, Ss had previously been assigned reading grade levels in the Reader's Digest Reding Skills Builder:

level 3, 11 Ss; level 4, 13 Ss; level 5, 7 Ss; level 6, 1 S; advanced level, 8 Ss.

A packet of "bonus cards" was issued to each student, and Ss were trained to imagine the scenes described on the bonus cards. Each day for three weeks each S read at least one story from his Reader's Digest. Once per page he was cued (red star) to pick up a bonus card and to imagine for a moment the scene described, and then to continue reading. At the end of the story S was cued (pink dot) to complete one vocabulary or one comprehension exercise. He then completed a daily self-report card by noting the number of pages he had read and his score on the review exercise. Following the completion of this learning task, S could choose either to read additional stories in the Reader's Digest, or to hand in the materials for the study and to engage in other classroom learning activities.

The complete instructions given to the students are as follows:

FIRST DAY INSTRUCTIONS

> Beginning today, and continuing for the next few weeks, you will be using some new techniques which should make learning to read more fun for you. Since this is new to you, please follow the directions carefully. The directions will be given to you everyday for a while. If you have any questions, be sure to ask.
>
> First, pick up the copy of the Reader's Digest Reading Skills Builder assigned to you . . . . Also take a reading self-report card (the printed 3x5" index card). On the top of the card write your name. Then write this class hour (give). And finally write today's date (give). You will be asked to fill out one of these cards each day during the next few weeks.

When you've finished that, come and pick up your packet of bonus cards. Just for fun today, take out the bonus cards and read what the top card says. The bonus card asks you to imagine something. Let's try . . . . Close your eyes very tightly . . . And picture in your mind what the card says to imagine . . . Do you see any colors? . . . What shapes do you see? . . . Do you smell anything? . . . Can you touch it? . . . What sounds do you hear? . . . Just let your mind wander for a moment as you imagine what the card asks you to . . . That's good . . . Now open your eyes, and look around a bit . . . .

DAILY INSTRUCTIONS

After above (first day) procedure is briefly reviewed . . .

Today I'd like you to read at least one story in your Reader's Digest. Each time you come to a STAR in your story, pick up the top bonus card. Then spend a moment imagining what it says on the card. After you've finished imagining place the bonus card on the bottom of the pile. Continue to read the story until you come to the next STAR. Then pick up the next bonus card and imagine what it asks you to. Continue in this way until you've read the whole story . . . .

When you've finished reading the story, please complete the exercise at the end of the story which is marked with a PINK DOT. And PLEASE do ONLY that exercise at the end of the story which is marked with the PINK DOT. When you've finished the exercise, see how well you did by correcting your work. (The answers are given in the Teacher's Editions of the Reader's Digest.) Finally, mark your score in the blank on your self-report card. Also on your report card, please mark the number of words which you read today. This is printed at the end of your story . . . . If you wish to read another story today, proceed as you did with Story #1.

When you've finished in your Reader's Digest for today, please return your book, your packet of bonus cards, and your daily reading self-report card to this desk. Then you may do other reading or work. PLEASE DO NOT take your bonus cards out of this room . . . . Return them when you are finished so that you will have them to use tomorrow.

REMEMBER: WHEN YOU READ THE BONUS CARD, PICTURE IN YOUR MIND AS CLEARLY AS YOU CAN WHAT IT ASKS YOU TO IMAGINE.

Treatment conditions

Each day all Ss read from their Reader's Digest Reading Skills Builder, and corrected and reported their daily performance. The systematic difference between the two treatment conditions was the type of reinforcement administered. Reinforcers consisted of scenes described on the "bonus cards" Ss were cued to read. In an attempt to minimize satiation to the reinforcers, each S was provided a previously unseen packet of bonus cards at the beginning of each week; there were four different packets of five bonus cards for each treatment condition.

Neutral Image Covert Reinforcement (Control Group). Upon cue Ss imagined neutral-valance scenes described on the bonus cards. The scenes were generated by Es, and consisted of images which were thought to be neither reinforcing nor punishing to junior high school students. The images included:

"Imagine. . . a big grey rock". . . "a man walking down the street". . ."a piece of chalk". . ."a rusty nail". . ."an electric fan". . ."a white T-shirt". . ."a dandelion". . . "a pencil sharpener". . ."the sound of a train in the distance". . ."an empty blackboard". . ."an ice cube". . ."a banana peel". . ."a stop sign". . ."the sound of a hammer" . . ."a wooden chair". . ."an ash tray". . ."a bowl of water". . ."the sound of a saw". . ."a pile of sand". . . and "a desk."

Positive Image Covert Reinforcement (Treatment Group). Upon cue Ss imagined positive-valance scenes described on the bonus cards. These scenes, generated by Es, were thought to consist of images pleasurable to junior high school students. The images included:

> "Imagine . . . you have just won a free day at Disney World" . . ."you are one inch tall and none of the teachers can find you". . ."you're the star of your favorite TV show" . . ."you are the only one in the world who can read the secret formulas in a magic book". . ."you have all of Superman's powers and can do anything you wish". . .OR "you're dancing with the grooviest guy in the school". . . "you have just won $100 to buy anything you want". . ."you have just been elected the 'coolest kid' in the school" . . ."you can fly and you're looking down on the earth below". . ."you are eating the biggest ice cream sundae ever made (and you're not even getting full!)". . ."you have just been chosen cheerleader of the school" OR "you fly your helicopter to a mountain top and rescue the best looking girl in the school". . ."you have just won the football game with a 90 yard touchdown run, and the crowd is cheering and screaming your name". . ."you can talk to the animals and they can talk to you". . ."you found a magic bottle, and the genie inside will grant you any three wishes you want". . ."the prettiest girl in school is drowning, and you manage to pull her out, and the principal gives you a special medal" OR "you have been chosen 'prom queen' at the high school". . ."it is a sunny summer morning and you can do anything you want today". . ."the most popular person in school stops you in the hall and tells you you're really cool". . ."you can make yourself invisible anytime you want". . ."you have just won a trip to Hawaii and you can take three of your friends with you". . ."you just won an award, your picture is on the front page of the newspaper, and everyone is proud of you". . ."you're dancing with the grooviest girl in school" OR "David Cassidy bumps into you downtown and asks you to take a ride in his car."

Data source

Measures

Number of days absent: It was predicted that treatment Ss would enjoy imagining the positive scenes, and would be absent from class less often than control Ss.

Attitude score: A ten-item semantic differential scale was constructed to measure Ss' attitudes toward school in general, and toward reading and their reading program in particular. It was hypothesized that treatment Ss would score more positively on an attitude post-test.

Total number of words read:

Mean number of words read per day:

Total number of stories read:

Mean number of stories read per day:

It was hypothesized that treatment Ss would be reinforced for reading, and would read a greater volume than their control counterparts.

Mean percentage scores on review exercises: It was predicted that treatment Ss would be reinforced for reading the text of their Reader's Digest, and that this would increase their comprehension and vocabulary scores on the review exercises.

Gates-MacGinitie Reading Test: It was hypothesized that the treatment Ss would obtain higher scores on the speed-accuracy, vocabulary, and comprehension subtests of the Gates-MacGinitie. Difference scores were not available, as pre-test data were incomplete. Between group comparisons were made using post-test scores.

Analysis of data

A multivariate analysis of covariance design was used to test treatment effects.

Covariates were Ss' assigned reading level in the Reader's Digest.

Dependent variables were S's number of days absent during the three-week period, his attitude score, the total number of words reported read, mean number of words read per day present, total number of stories read, mean number of stories read per day present, mean daily percentage score on Reader's Digest review exercises, and post-scores on the Gates-MacGinitie subtests.

Results

Analysis of the data indicated no statistically significant differences between treatment conditions. There was a significant interaction between Ss' class periods and treatment conditions, and the data suggest that the assignment of Ss into class periods accounted for much of the statistical variance.

Implications for future research

Problems of this specific study

Certain problems of this specific study should be closely scrutinized before replications or extensions of the study are attempted. Outcome measures--in particular the attitude score, the number of days absent, and the number of stories read--may have been too insensitive to detect differences between Ss. There may have been "ceiling effects" upon the volume of reading which may have constrained the scores of treatment Ss. That is, S's volume of reading was limited in part by the length of his class period.

The attitude scale had not been used previously (it was generated specifically for this study) and only 3 of the ten items ("I enjoy reading much more"; "I am a better reader"; "My school work has improved") discriminated between treatment groups. More sensitive indices of reading/academic attitude would be necessary for future study.

The length of time for this study was rather short (three weeks), due to changes in school routine beyond E control. No doubt differences in performance between the two treatment groups were limited by the restricted time period. Lengths of future studies should be expanded to allow development of between groups differences.

The "positive" imaginal scenes generated by E may not have been more reinforcing to treatment Ss than the "neutral" images were to control Ss. Future studies will necessitate the use of coverants which have proven reinforcement value to Ss.

Finally, the interaction between class periods and treatment groups decreased the significance of treatment effects. Ss were randomized within class periods, and class period was used as a blocking variable. Perhaps assignment to treatment group, based upon a random sampling from the total sample population, would have eliminated the class x treatment interaction.

General research questions

Possible within and between group contamination may have weakened the reinforcement value of the positive imaginal scenes. Although in a clinical setting it is desirable to provide positively reinforcing events (covert and overt) for as many individuals as possible, researchers in covenant conditioning face the problem of limiting covert events to Ss being studied. This is impossible in practice, since covert events are ultimately under S control. Future investigations would do well to consider research strategies or types of coverants which minimize between group contamination of the covert event.

The possible non-reinforcing effect of the "positive" imaginal scenes used in this study has been discussed. Covert operant reinforcement

may have interfered with the learning task involved; that is COR may interfere with the cognitive processes involved in reading. Future study is indicated to determine to what extent coverants may be used to reinforce covert tasks, and whether the various classes of coverants might be differentially used to reinforce various desirable events (covert or overt).

Age effects upon the reinforcement value of coverants is another area in question. Ss in this study may have been too young to be affected by COR. Developmental variables affecting COR are as yet unresearched.

Related study in progress

The author is presently investigating whether a related intervention (self-management) is effective in enhancing performance of remedial reading learning tasks. A token economy (Allyon and Azrin, 1968) was developed for the Title I remedial reading program described in the previous study. After a six-week baseline period during which relevant behavior was observed by the teacher, an externally (teacher) monitored token economy (EMTE) was instituted for four weeks. During a third phase one half Ss returned to baseline (reversal), one-fourth remained at EMTE, and the remaining Ss self-monitored their own behavior in the reading class. For the current phase all Ss returned to EMTE.

Because the study is still in progress, a statistical analysis of the data has not yet been attempted. However, the data graphically

indicate a significant difference between baseline and token economy conditions (externally or self-monitored). Of course the efficacy of classroom token economies has been comprehensively documented elsewhere (e.g. O'Leary and Drabman, 1971; Krasner and Krasner, 1973). The finding germane to this discussion is that self-monitored performance within an existing classroom token economy is at least as good as externally monitored performance. This is essentially the conclusion of Knapczyk and Livingston (1973) who successfully employed a self-monitored token economy to increase reading task performance within a junior high school special education program.

In the study of coverant conditioning positive imaginal reinforcement had no significant effect upon remedial reading learning tasks. Yet in the same classroom a second type of covert intervention (self-monitoring) was at least as significantly effective as token economy, an extremely powerful and widely researched behavior modification technique. It is unclear why a self-monitored token economy enhanced remedial reading performance, while positive imagery had no significant reinforcing effect upon relevant performance. We remain relatively ignorant of the differential reinforcing effects of the various classes of coverants (Mahoney, 1970).

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